

A Forrester Total Economic Impact™ Study Prepared For Microsoft

Total Economic Impact Of SQL Server 2012 Upgrade

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FORRESTER

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Executive Summary

In October 2011, Microsoft Corporation commissioned Forrester Consulting to examine the total economic impact and potential return on investment (ROI) enterprises might realize by upgrading from SQL Server 2008 to SQL Server 2012. In this study, 10 participating customers described how SQL Server 2012 is capable of supporting mission-critical applications — in healthcare, financial services, government, gaming, and a host of other industry applications. The new feature set of SQL Server 2012 includes new functionality for high availability, disaster recovery, high performance, business intelligence (BI), security, and cloud-readiness. The customers interviewed for this study cited different motivations for investing in SQL Server 2012, with varying reasons and rationales based on the functionality with the most impact to their business results or business needs. Some cited BI, while others described availability and security or spatial programming and xVelocity in-memory technologies as the main reasons for their upgrade. The new AlwaysOn capability, a set of features that gives customers the opportunity to manage their high availability and disaster recovery needs through a single solution, including the use of multiple, active secondaries, was among the most-cited, most important reason behind making an early-adopter investment in SQL Server 2012. Forrester found that upgrading to Microsoft's SQL Server 2012 can deliver an anticipated ROI of between 149% and 189% with a projected 12 to 13 month payback period.

In interviews with Microsoft SQL Server customers (participants in Microsoft early-adopter programs for upgrading to SQL Server 2012), Forrester identified the following key benefits of investing in SQL Server 2012:

1. Higher productivity for DBAs and system administrators.
2. Higher productivity for application developers.
3. Avoiding service-level agreement (SLA) penalty payments to external customers when outages occur or data is lost.
4. New business intelligence (BI) capabilities for business users (iWorkers) with new self-service BI and reporting tools.

These are the financial, quantified benefits that will be of interest to database administrators, as well as IT and business unit decision-makers, who rely on mission-critical systems. Their focus will be on the greater assurances that the system is up all the time. The financial benefits that make a compelling business case for an investment in SQL Server 2012 support and enable the most important value, which is to win more customers and to scale the business up and out using the same level of resources.

Further, the IT decision-makers interviewed for this study described next-phase and future benefits that they expect will accrue from their investments in SQL Server 2012, including:

1. Gaining a platform for cloud initiatives.
2. Cost-effectively keeping up with business growth.

Additionally, Forrester heard the following from customers regarding the value of upgrading to SQL Server 2012:

“We avoided a major [database infrastructure] project that would have cost millions. That project is now obsolete. We now run 2 servers instead of 20. We can scale with one pair. One box costs \$100,000 and we saved 18.”

“Now iWorkers can do [analysis and reports] without new skills or a new vocabulary. The BI in SQL Server 2012 closes the IT-iWorker gap, bringing IT and iWorkers closer without more work. Personal BI becomes corporate BI. We become a smarter, faster hospital. More automating and reducing ad hoc reports reduces dependency on IT so we can do other stuff.”

“The ultimate goal [for our investment in SQL Server 2012] is to create a solid platform and a tested, proven solution for future implementations, to build a [database] platform for the future of this organization.”

The purpose of this study is to provide readers with a framework for evaluating the potential financial impact on their organization of upgrading from a previous version of SQL Server to SQL Server 2012. Forrester’s aim is to clearly show all calculations and assumptions used in the analysis. Readers should employ this study to better understand and communicate a business case for upgrading to SQL Server 2012.

SQL Server 2012 Delivers Quantifiable Business Value

Forrester’s interviews with 10 existing SQL Server 2012 customers and subsequent financial analysis found that a composite organization based on the companies interviewed can expect to experience the ROI (original and risk-adjusted), costs, and benefits shown in Table 1. See Appendix A for a description of the composite organization.

Table 1 illustrates the original and risk-adjusted (present value) financial results that can be achieved by the composite organization. The risk-adjusted values take into account uncertainty or variance that exists in estimating the costs and benefits, which produces more conservative estimates.

Table 1

Composite Organization Three-Year Risk-Adjusted And Non Risk-Adjusted ROI — **Present Value**¹

	ROI	Payback period	Total benefits (PV)	Total costs (PV)	Net present value
Risk-adjusted	149%	13.6 months	\$817,910	(\$328,214)	\$489,697
Non-risk-adjusted	189%	12.1 months	\$908,789	\$314,585	\$594,205

Source: Forrester Research, Inc.

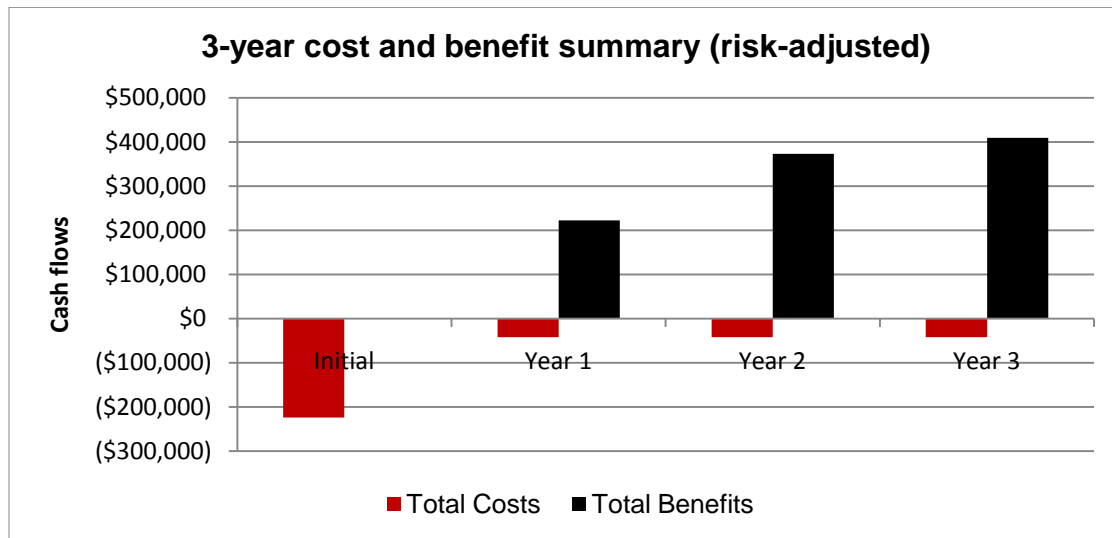
- **Benefits.** The composite organization can expect the following benefit categories that represent those experienced by the interviewed companies. These benefits are modeled based on Forrester research and customer interview data and accrue to the quantifiable benefits used for risk and non-risk adjusted calculations:

- **Greater productivity for IT staff (DBAs, systems administrators).** With new capabilities in SQL Server 2012, IT staff are relieved of a number of tasks that free them for other duties. Examples of new functionality that bring task relief include AlwaysOn (automatic failover, availability group management, and automatic page repair), contained database login, and more.
- **Incremental productivity for application developers.** This benefit category can be expected to increase as more applications and data are moved onto the SQL Server 2012 platform, and developers gain advantages and time from SQL Server Developer Tools, FileTable, improved search (semantic and full-text), support for spatial data, improved workflow, greater query processing speed, and agnostic flexibility with respect to on-premises/cloud/hybrid and/or the Windows Azure platform.
- **Avoiding potential service-level agreement penalties.** Greater availability and overall performance from SQL Server 2012 can be expected to cut the frequency and severity of outages and thus potential penalty payments to end customers, either internal or external.
- **Greater productivity and delivered business value for information workers.** Built-in BI and new tools for analytics, data visualization, reporting, integration with SharePoint, and query performance increases will reduce the time previously required to manipulate data while giving business users new insight into their data as well as the ability to create their own dashboards and scorecards and collaborate with colleagues.
- **Costs.** The composite organization is assumed to incur the following net new costs. The cost figures highlighted below are summarized in the Total Costs found on Table 6 (page 14) and factor into the non- and risk-adjusted Total Costs (PV) in Table 1 above, as well as Table 13 and Table 14 on page 22:
 - **SQL Server 2012 Enterprise licenses and Software Assurance:** \$267,078.
 - **SQL Server 2012 Business Intelligence licenses and Software Assurance:** \$27,825 (Note: Customer already owns CALs and thus only pays for server licenses and SA).
 - **Implementation labor costs.** For initial planning, setup of server and storage, and installing SQL Server 2012 and migrating the initial databases, the composite will incur \$41,300 in labor from IT executive, DBAs, and systems engineers.

Figure 1 illustrates the risk-adjusted financial results that can be achieved by the composite organization. The risk-adjusted values take into account uncertainty or variance that exists in estimating the costs and benefits, which produces more conservative estimates.

Figure 1

Composite Organization: 3-Year Financial Results



Source: Forrester Research, Inc.

Factors Affecting Benefits And Costs

The following factors may affect the financial results that an organization may experience:

- Larger organizations will likely see greater complexity and time/labor requirements for upgrading to SQL Server 2012. Those SMB organizations interviewed for this study, by contrast, described the upgrade as practically a nonevent for their IT departments.
- Time and labor requirements increase steeply with the number and scope of mission-critical applications and databases in the scope of the upgrade.
- High availability and disaster recovery can be configured in many different ways. Study participants counseled that larger organizations with more complex architectures especially should invest in the initial planning and data architecture design and build a solid understanding and road maps at the outset of their SQL Server 2012 upgrade.
- Upfront planning can help unlock potentially undiscovered SQL Server capabilities — security features or BI functionality, for example — that might have existed in previous versions, had been overlooked and not typically used by many enterprise customers, and have now been improved.
- Business value and productivity increases for users, customers, or business units are highly situational for every entity that is considering the step up to SQL Server 2012. Examples include:
 - Avoiding a \$20 million database platform project by moving workloads onto SQL Server 2012 because, “Our whole SQL [Server] environment costs less than 1 [other DBMS vendor] box.

- The value of eliminating disruption for just one customer and one \$100,000 transaction, times 10 or 100, is difficult to quantify but very difficult to ignore.
- “Chatting with one board director,” recounted one study participant, “I explained that there are many features our business wants for customers that we struggled to provide. [Prior to SQL Server 2012] we could not implement them for fear of blowing up the whole database system. Now we can just do them, like integrating social media. We can get to 100 million users. My management never considered that before because we could not do it. And that only costs us a bit of fun money.”

For this reason, only the most conservative financial calculations are shown and included in Forrester TEI framework. Readers of this study are therefore encouraged to create their own user-focused scenarios, especially for BI benefits, and base such scenarios on the number and the roles affected within their organizations.

Disclosures

The reader should be aware of the following:

- The study is commissioned by Microsoft and delivered by the Forrester Consulting group.
- Forrester makes no assumptions as to the potential return on investment that other organizations will receive. Forrester strongly advises that readers should use their own estimates within the framework provided in the report to determine the appropriateness of an investment in Microsoft SQL Server 2012.
- Microsoft reviewed and provided feedback to Forrester, but Forrester maintains editorial control over the study and its findings and does not accept changes to the study that contradict Forrester’s findings or obscure the meaning of the study.
- The SQL Server 2012 early-adopter customers interviewed for this study were provided by Microsoft.

TEI Framework And Methodology

Introduction

From the information provided in the interviews, Forrester has constructed a Total Economic Impact™ framework for those organizations considering implementing Microsoft SQL Server 2012. The objective of the framework is to identify the cost, benefit, flexibility, and risk factors that affect the investment decision.

Approach And Methodology

Forrester took a multistep approach to evaluate the impact that Microsoft SQL Server 2012 can have on an organization (see Figure 2). Specifically, we:

- Interviewed Microsoft engineers and product management subject matter experts and Forrester analysts to gather data relative to SQL Server 2012 and the marketplace for similar database management systems.
- Interviewed 10 organizations currently using Microsoft SQL Server 2012 to obtain data with respect to costs, benefits, and risks.
- Designed a composite organization based on characteristics of the interviewed organizations (see Appendix A).
- Constructed a financial model representative of the interviews using the TEI methodology. The financial model is populated with the cost and benefit data obtained from the interviews as applied to the composite organization.

Figure 2

TEI Approach



Source: Forrester Research, Inc.

Forrester employed four fundamental elements of TEI in modeling Microsoft SQL Server 2012's value:

1. Costs.
2. Benefits to the entire organization.
3. Flexibility.
4. Risk.

Given the increasing sophistication that enterprises have regarding ROI analyses related to IT investments, Forrester's TEI methodology serves the purpose of providing a complete picture of the total economic impact of purchase decisions. Please see Appendix B for additional information on the TEI methodology.

Analysis

Interview Highlights

A total of 10 interviews were conducted for this study, involving representatives from the following companies:

1. Leading provider of mobile merchandising, marketing, and advertising solutions.
2. IT services group providing centralized database and applications services to a major healthcare system.
3. Leader in online betting and real money gaming in nearly every sport across many countries and languages.
4. Provider of software for events, ticketing, and scheduling.
5. Developer of mobile mapping and geographic information system (GIS) technology for database access, mapping, and global positioning system (GPS) integration via handheld and mobile devices.
6. 10,000-employee provider of IT, software and project management to shipbuilders and owners.
7. Microsoft Certified Gold partner providing database and collaboration services.
8. IT group for a municipality of 400,000 people.
9. Financial data brokerage specializing in providing historical financial market for testing trading strategies.
10. Major European travel and tour provider.

These 10 study participants described how SQL Server 2012 is capable of supporting mission-critical applications — in healthcare, financial services, government, business services, and more industries. All of the participating organizations have already or plan to move such applications onto their SQL Server 2012 platform.

Further salient takeaways from the interviews regarding these customers' motivations for upgrading to SQL Server 2012 include:

- The new AlwaysOn capability was among the most-cited, most important reasons behind making an early-adopter investment in the SQL Server product.
- Increasing uptime for both the immediate business needs and for compliance reasons.
- Overall performance in general and speed of transactions in particular was key for several customers in the study.
- Leveraging existing SQL Server (2005 and 2008) experience and skills made the upgrade to SQL Server 2012 a relatively easy undertaking.
- Many described the upgrade costs as negligible compared with the added performance and functionality in SQL Server 2012. Few prepared a formal business case to justify the investment.

Indicators of the benefits and value from SQL Server 2012 included:

- Eliminating the need to schedule downtime, and we presume reducing if not eliminating outages, translates into fewer IT staff hours needed, and a shift to higher order priorities.
- Some participants moved databases and applications for non-Microsoft systems onto their SQL Server 2012 platform, thus consolidating systems, hardware, skill requirements, and saving funds and time compared to an alternative.
- One company described how upgrading to SQL Server 2012 made sense given the new xVelocity in-memory column store functionality, which saved \$20 million in an alternative database upgrade scenario.
- Increases in performance now can save server hardware expenditures, now or later. One respondent told us that with the new product and new hardware, CPU usage went from 65% during peak to 7%. That means much more headroom and time before new machines are needed.

Composite Organization

Based on the interviews with the 10 early-adopter customers provided by Microsoft, Forrester constructed a TEI framework, a composite company, and an associated ROI analysis that illustrates the areas financially affected. The composite organization that Forrester synthesized from these results represents the data services team within a centralized provider of information technology and other support services to a host of financial services departments. The enterprise has approximately 12,000 employees, holds more than 5 million customer records, and handles approximately 1,000,000 SQL Server database queries per day. The data services group manages data stores behind mission-critical applications that must be available 24x7, and processes \$1 billion in financial transaction per year. See Appendix A for a description of the composite organization.

Framework Assumptions

The discount rate used in the PV and NPV calculations is 10% and time horizon used for the financial modeling is 3 years. Organizations typically use discount rates between 8% and 16% based on their current environment. Readers are urged to consult with their respective company's finance department to determine the most appropriate discount rate to use within their own organizations.

Costs

This section describes the overall costs for the composite company to initially upgrade to SQL Server 2012. These are the net new costs compared with the previous SQL Server 2008 platform.

Server deployment assumptions were made based on an average customer implementation within the customer composite profile. Assume that a typical enterprise customer will deploy AlwaysOn with 1 primary and 2 active secondary servers, and two servers to support their BI activities; 1 for Reporting Services (report server) and 1 for Analysis Services (OLAP cube). The primary AlwaysOn server supports their primary workloads. All server systems are assumed to have 2 processors with 4 cores each.

SQL Server 2012 Enterprise Licenses

Forrester assumes that the composite customer organization is already an existing enterprise customer (e.g., in the third year of an existing EA agreement for this licensing scenario). We are assuming an EA Level B pricing level. Server Enterprise licenses are sold in 2-core packs. Prices are US reseller estimates only. Pricing may vary by region and additional program restrictions or requirements may apply.

Table 2

SQL Server 2012 Enterprise Licenses

Ref.	Metric	Calculation	Initial	Year 1	Year 2	Year 3	Total
A1	Cost per core		\$6,359				
A2	Number of cores per CPU		4				
A3	Number of CPUs		2				
A4	Number of servers		3				
At	Enterprise edition core licenses	$A1 \times A2 \times A3 \times A4$	\$152,616	\$0	\$0	\$0	\$152,616

Source: Forrester Research, Inc.

Software Assurance For Core Licenses

We assume the company purchased Software Assurance as part of its original SQL Server 2012 Enterprise license agreement. Software Assurance pricing is based on 25% of total license costs. This provides three years of coverage.

Table 3

Software Assurance For Core Licenses

Ref.	Metric	Calculation	Initial	Year 1	Year 2	Year 3	Total
B1	License fees		\$152,616	\$0	\$0	\$0	
B2	Yearly percent			25.0%	25.0%	25.0%	
Bt	Annual Software Assurance	$B1 \times B2$	\$0	\$38,154	\$38,154	\$38,154	\$114,462

Source: Forrester Research, Inc.

SQL Server 2012 Business Intelligence License And Software Assurance (SA)

We further assume that all users have existing SQL Server CALs with SA (implying no net new CAL costs), and based on the estimated number of users (5,000), we are assuming an EA Level B pricing level. Assume the composite purchases one Business Intelligence Server License (2 physical servers for OLAP and Sequel Server Reporting Services) for \$7,950 per server license, plus Software Assurance.

Table 4

SQL Server 2012 Business Intelligence License And SA

Ref.	Metric	Calculation	Initial	Year 1	Year 2	Year 3	Total
C1	Server license		\$7,950				
C2	Units		2				
Ct	Business Intelligence server license/annual SA cost (25%)	C1*C2	\$15,900	\$3,975	\$3,975	\$3,975	\$27,825

Source: Forrester Research, Inc.

Internal Implementation Labor

The initial implementation consisted of assessing and planning the upgrade, setting up the initial SQL Server 2012 server and storage, and installing SQL Server 2012 and migrating the initial databases. Once the initial implementation was completed, the upgrade process became part of “business as usual” operations for the database administration (DBA) team, the costs of which are part of ongoing operations.

We assume the composite organization, like the majority of study participants, did all of this work in house without need of external consultants. The reader’s organization might require professional services and should take these costs into consideration.

Implementation required various levels of effort by the DBA team (spread out among 3 individuals), the storage and server teams, and some management oversight and direction. The DBA hourly cost is \$65.00, the hourly cost of the storage and server team members is \$50.00 and \$70.00 for the top level. The resulting implementation labor cost is equal to \$41,300 as shown in Table 5 below.

Table 5

Internal Implementation Labor Cost

Ref.	Metric	Calculation	Initial	Year 1	Year 2	Year 3	Total
F1	Number of IT executives		3				

	(VP/director)						
F2	Hourly rate per person		\$70.00				
F3	Hours, each		10				
F4	Number of DBAs		3				
F5	Hourly rate per person		\$65.00				
F6	Hours, each		160				
F7	Number of systems engineers		2				
F8	Hourly rate per person		\$50.00				
F9	Hours, each		80				
Ft	Initial internal implementation labor costs	$=(F129 \times F130 \times F131) + (F132 \times F133 \times F134) + (F135 \times F136 \times F137)$	\$41,300	\$0	\$0	\$0	\$41,300

Source: Forrester Research, Inc.

Total Costs

Table 6 summarizes the costs associated with the composite company's implementation of SQL Server 2012.

Table 6

Total Costs: Software And Implementation Labor

Ref.	Cost category	Initial	Year 1	Year 2	Year 3	Total
Ato	Enterprise edition core licenses	(\$152,616)	\$0	\$0	\$0	(\$152,616)
Bto	Annual Software Assurance	\$0	(\$38,154)	(\$38,154)	(\$38,154)	(\$114,462)
Cto	Business Intelligence server license/annual SA cost	(\$15,900)	\$3,975	\$3,975	\$3,975	(\$27,825)
Fto	Initial internal implementation labor costs	(\$41,300)	\$0	\$0	\$0	(\$41,300)
	Total costs (original)	(\$209,816)	(\$42,129)	(\$42,129)	(\$42,129)	(\$336,203)

Source: Forrester Research, Inc.

“If one server went down [prior to SQL Server 2012], we were no longer highly available. If I lost a second server, we lose data! That is not allowed; it’s illegal. We would have to go offline. If we’re down for hours, we lose several hundreds of thousands, we lose our license, and we are out of business. We are regulated and licensed by multiple countries. With [SQL Server] 2012, given our high availability, we added another 9.” (Team leader, database engineering team, gaming company)

Benefits

In interviews with Microsoft SQL Server customers, Forrester identified the following key benefits of investing in SQL Server 2012:

1. Higher productivity for DBAs and systems engineers.
2. Higher productivity for application developers.
3. Avoiding service-level agreement (SLA) penalty payments to external customers when outages occur or data is lost.
4. New BI capabilities for business users (iWorkers) with the presentation of self-service BI and powerful reporting tools.

Business unit decision-makers who rely on mission-critical systems for internal and customer-facing applications will focus on the greater assurance that the system is up all the time; bad news is less likely with high availability and disaster recovery capabilities. Database administrators and IT budget leaders will focus on productivity and system performance. Better hardware utilization (machines that were doing nothing now run secondary data copies for near real-time reporting and data usage) is another benefit along with perhaps new business opportunities from better understanding of customer data.

Higher Productivity For DBAs And IT Staff

The improved capabilities of SQL Server 2012 over the existing SQL Server environment enable existing employees to be more productive. Further, some of the new capabilities that save staff time have corresponding benefits of greater security (like user-defined servers roles, for example, or contained database authentication) and data quality (backup secondaries and distributed replay, as examples). As shown in Table 7 below, this translates into an initial benefit of 7.5%, according to interviewees in this study, ramping to 15% by the second year of operation. This is the equivalent of approximately two and a half full-time equivalents FTEs from Year 2 onward for the composite company.

- SQL Server DBAs and IT staff at all levels benefit from AlwaysOn, when more systems can be operated at higher performance levels, with less downtime and fewer errors.
- Automatic failover, availability group management, contained database login, automatic page repair, and other features result in hours of saved per week for DBAs. Availability groups reduce the pain and time of a failover (either planned or unplanned), as the logons and maintenance plans can fail over with the database. DBAs spend less time looking for one-off logon issues or making sure that a backup will still happen after a failover.

- Compared to previous versions, SQL Server 2012 contains more new tools for managing and visualizing the servers that reduce time for set up, manage, and troubleshoot databases, especially in concert with familiar tools like Microsoft SQL Server Management Studio.
- The data backup and restore staff will benefit from the ease and flexibility brought by active secondary databases.

Table 7

Increased IT Staff Productivity Translated To Dollars Saved

Ref.	Metric	Calculation	Year 1	Year 2	Year 3	Total
A1	Number of IT staff		16			
A2	Hourly rate per person (average)		\$60.00			
A3	Number of hours per year		1,760			
A4	Percent improvement		7.5%	15%	15%	
At	Incremental output per IT staff (DBA, manager, staff)	$A1 \times A2 \times A3 \times A4$	\$126,720	\$253,440	\$253,440	\$633,600

Source: Forrester Research, Inc.

Increased Developer Productivity

In addition to the specific examples of DBA and systems engineering productivity gains discussed above, application developers will also realize productivity gains. As shown in Table 8 below, this translates into an initial benefit of 5%, ramping to 7.5% and 10% by the second and third years of operation, respectively. This increased productivity accrues from improved workflow, high availability and benefits of an upgrade to SQL Server 2012, such as:

- Tools for managing database projects and change views (SQL Server Data Tools) and on-premises/cloud/hybrid flexibility, especially leveraging SQL Azure.
- The xVelocity in-memory column store functionality, compelling enough to convince two enterprises participating in the study to terminate databases in another DBMS and move them to SQL Server 2012.
- New or improved functionality cited frequently includes FileTable, full-text and semantic search, windowed aggregates, and spatial support (which is very helpful with time-based data as well as geo-coded content). Availability Group Listener allows app developers to code just one connection stream, saving time and simplifying data center connection troubleshooting, which also creates a positive impact on failover times.
- Clear separation of the transaction processing (OLTP) and reporting (data warehouse) stores, with near real-time data for the former and query performance increases for the latter.

- Application code writers can work with new functionality for offloading workloads to secondary servers, reports from that data, which can now stay out of the way of transactions. Reports can be sped up from minutes (or longer) to seconds.

One interviewee explained to Forrester, “Three years ago, SQL Server was peripheral to use. With spatial support and some other features, it’s now core.”

Table 8

Increased Developer Productivity Translated To Dollars Saved

Ref.	Metric	Calculation	Year 1	Year 2	Year 3	Total
B1	Number of workers		4			
B2	Hourly rate per person		\$42.50			
B3	Number of hours per year		1,760			
B4	Percent improvement		5.0%	7.5%	10.0%	
Bt	Incremental output per developer	$B1*B2*B3*B4$	\$14,960	\$22,440	\$29,920	\$67,320

Avoiding SLA Penalties

For a financial services firm like the composite company, as well as for several study participants in various industries, service-level agreements are in place with customers (internal or external), which, when an outage or data loss occurs, require financial recompense. For prospective customers that do not have such SLAs in place, this category can serve as a proxy for reputation damage from the same sort of database management failure. The amounts shown below in Table 9 are very conservative, and users of this study may choose to increase the number and amount of the penalties.

Table 9

SLA Penalties Avoided

Ref.	Metric	Calculation	Year 1	Year 2	Year 3	Total
C1	Average SLA penalty payment		\$10,000			
C2	Number of penalties avoided		4			
Ct	SLA penalties avoided	$D1*D2$	\$40,000	\$40,000	\$40,000	\$120,000

Source: Forrester Research, Inc.

Incremental Output For iWorkers

“Now iWorkers can do [analysis and reports] without new skills or a new vocabulary,” noted one interviewee. “The BI in [SQL Server] 2012 closes the IT-iWorker gap, bringing IT and iWorkers closer without more work. Personal BI becomes corporate BI. We become a smarter, faster hospital. More automating and reducing ad hoc reports reduces dependency on IT so we can do other stuff.”

With the BI capabilities of SQL Server 2012, business users can more easily gain insight rather than just managing and manipulating data. A lot of data is locked in unstructured data sources. The key is to unlock that potential to make sense of the data with BI tools. Enterprises need to be able make sense of their data versus just having it available, to see patterns and make predictions. Now IT can focus on keeping SQL Server up and running; the analyst does the BI, unlocking the insights with managed self-service data discovery across structured, unstructured, and cloud data sources.

For the composite company, we assume that approximately 300 business users (a conservative count) touch SQL Server databases every day, with many more dependent on the outputs. With SQL Server 2012 they get built-in business intelligence (BI) and new tools for analytics, integration with SharePoint, and performance boosts to cut the total time for queries by a factor of 10 or more. Improved performance and tools in SQL Server 2012 like the new version of PowerPivot for Excel and Power View, reduce the time previously required to manipulate data while giving business users new insight into their data, and the ability to create their own dashboards and scorecards. Information workers can now build their own schemas and models — without reliance on IT/DBA staff. This changes the rules for BI delivery. As shown in Table 10 below, the total productivity benefit realized by composite company iWorkers is 30 minutes per week per iWorker. Assuming that not every minute gained translates into productive work, Forrester applies a 50% discount factor to this benefit category. Forrester further assumes a ramp period (50%, 75%, and 100% over Years 1-3, respectively) as iWorkers learn of new capabilities and incorporate the new tools over time. The reader can thus have greater assurance that this reduced benefit is achievable and will result in direct financial benefit.

Table 10

Incremental iWorker Productivity Translated To Dollars Saved

Ref.	Metric	Calculation	Year 1	Year 2	Year 3	Total
D1	Number of iWorkers using SQL resources		300			
D2	Hourly rate per person		\$35.00			
D3	Number of hours saved per year per iWorker		25.0			
D4	Percent captured		50%			
Dt	Incremental output per iWorker	$E1 \times E2 \times E3 \times E4$	\$131,250	\$131,250	\$131,250	\$393,750

	Ramp		50%	75%	100%	
Dto	Total (original)		\$65,625	\$98,438	\$131,250	\$295,313

Source: Forrester Research, Inc.

Total Benefits

Table 11 summarizes the total quantified benefits that the composite organization can expect by upgrading to SQL Server 2012.

Table 11

Total Benefits

Ref.	Benefit category	Year 1	Year 2	Year 3	Total
Ato	Incremental output per IT staff (DBA, manager, staff)	\$126,720	\$253,440	\$253,440	\$633,600
Bto	Incremental output per developer	\$14,960	\$22,440	\$29,920	\$67,320
Cto	SLA penalties avoided	\$40,000	\$40,000	\$40,000	\$120,000
Dto	Incremental output per iWorker	\$65,625	\$98,438	\$131,250	\$295,313
	Total benefits (original)	\$247,305	\$414,318	\$454,610	\$1,116,233

Source: Forrester Research, Inc.

Avoiding Future Hardware Expenditures

SQL Server 2012 offers the ability to use secondary servers as part of database infrastructure. The secondary servers no longer need to remain idle waiting for a failover. Instead, they can be used for backup, reporting, ad hoc queries, or other uses. So organizations may be able to avoid significant financial outlays for server hardware in the future. SQL Server AlwaysOn offers the addition of readable secondaries, which allows customers to move readable workloads off the primary and onto the secondary, getting utilization of all their HA/DR hardware. Another improvement that can reduce costs is the ability to have primary and secondary servers that do not share a disk drive. Instead of only supporting shared arrays, now these machines can have shared SAN storage between failover partners. For some enterprise customers, an upgrade to SQL Server 2012 will forestall or avoid significant future hardware expenditures, although such cases are highly situational, so no calculation is included in this financial framework.

Flexibility

Flexibility, as defined by the TEI methodology, represents an investment in additional capacity or capability that could be turned into financial — or scholastic — benefit given a future additional investment. This provides an organization with the “right” or the ability to engage in future initiatives, but not the obligation to do so. There are multiple scenarios in which an enterprise might choose to implement SQL Server 2012 and later realize additional uses and business opportunities or financial value.

These real options have been described to Forrester by study participants who outlined possible new routes on their technology road maps and some likely directions and next steps for their organizations. Although data for calculating the value of these flexibility options was insufficient when this study was conducted, especially at an early stage of deploying the product, our interviews identified several areas that will produce flexibility options based on next-stage real options that have been described by study participants:

Foundation For Cloud

Although study participants have not made great leaps to cloud computing in connection with their database environments, a number of interviewees described the possibility of cloud projects and pilot efforts as next steps once implementation of SQL Server 2012 is complete or at least more advanced. Remote block storage and the ability to easily store data in the cloud, and to point applications at the data, are under consideration for some SQL Server shops. Running some applications in the cloud is commonplace among participants via SaaS packages. Next, customers expect to experiment with non-mission-critical applications. Platform-as-a-service (PaaS) is a next step for some, especially those that see value in the ability to scale up or down quickly. Participants described next steps that include Microsoft Windows Azure, perhaps to accommodate peak periods, for flexibility of shifting applications, data, and development from on-premises to cloud or hybrid — and back again as needs change. The new common developer technologies allow organizations to extend any of their data to their own data center, a rental DC in the cloud, or a hybrid environment, supported by common tools for management like SQL Server Management Studio — using the same skills sets as currently reside in SQL Server shops. The business case can be made by the hardware expenditures not made, while gaining advantage from newer “rented” hardware technologies. Several study organizations have made progress in virtualizing and consolidating their database platform (bolstered by high availability and disaster recovery), thus making private cloud initiatives easy next steps. All of which allows the enterprise to choose where to deploy — an on-premises data center, private or public cloud, or a hybrid.

Scaling Up And Out

One of the companies in the study described how the upgrade to SQL Server 2012 is expected to support a major international expansion. For the composite company, the option would be an expansion to encompass financial markets data from non-North American exchanges, while maintaining a database footprint that scales non-linearly, so adding few resources to handle business that is orders of magnitude larger than at present. Initially, the upgrade to SQL Server 2012 brings about a decrease in overhead, as described above, freeing the data services team to plan and execute new initiatives, and adding only moderate levels of staff or infrastructure, or none, to support larger operations. “The biggest thing is a decrease in overhead that frees us to do other things,” noted one interviewee. “And it frees the development team to do new development, not just keeping the old system operational.”

BI For Those That Lack It, And More For Those Than Have Started

Not all customers are positioned to take advantage of the latest advances in BI if they have built no such capabilities to date. For these customers, the draw is unlocking potential that exists in data and has not been exploited so far. Other customers that have embarked toward some BI capabilities already will seek to expand their nascent initiatives and perhaps render obsolete some third-party tools or manual spreadsheet analyses and step up to modern, more powerful BI capabilities.

Higher Security

Customers often use just a superficial set of the security capabilities in SQL Server, whether 2005, 2008, or 2012. Some of these organizations will discover and deploy the enhanced auditing capability, certified compliance aids, and logging tools.

Risk

Forrester defines two types of risk associated with this analysis: implementation risk and impact risk. Implementation risk is the risk that a proposed investment in SQL Server 2012 may deviate from the original or expected requirements, resulting in higher costs than anticipated. Impact risk refers to the risk that the business or technology needs of the organization may not be met by the investment in SQL Server 2012, resulting in lower overall total benefits. The greater the uncertainty, the wider the potential range of outcomes for cost and benefit estimates. Further, some technical and business risks are reduced by the product; in this case, the ability to provide seamless patching, software upgrades, and rebuilding indices without impacting the business.

Quantitatively capturing implementation and impact risk by directly adjusting the financial estimates results in more meaningful and accurate estimates, and a more rigorous projection of the ROI. In general, risks affect costs by raising the original estimates, and they affect benefits by reducing the original estimates. The risk-adjusted numbers should be taken as “realistic” expectations since they represent the expected values considering risk.

The following implementation risk that affects costs is identified as part of this analysis:

- Internal implementation labor could be higher than original plan.

The following impact risks that affect benefits are identified as part of the analysis:

- All productivity benefits are considered to be highly uncertain, so are given aggressive risk adjustments.
- Avoided SLA penalty payments are estimates based on past experience, contingent on unfavorable events, and are discounted appropriately.

Some categories, licenses for example, are not risk adjusted because they can be determined in advanced and fixed by contract.

Table 12 below shows the values used to adjust for risk and uncertainty in the cost and benefit estimates. The TEI model uses a triangular distribution method to calculate risk-adjusted values. To construct the distribution, it is necessary to first estimate the low, most likely, and high values that could occur within the current environment. The risk-adjusted value is the mean of the distribution of those points.

Table 12

Cost And Benefit Risk Adjustments

Costs	Low	Most likely	High	Mean
Enterprise edition core licenses, SA	100%	100%	100%	100%
BI server license	100%	100%	100%	100%
Internal implementation labor	100%	100%	200%	133%
Benefits	Low	Most likely	High	Mean
Incremental output per IT staff	50%	100%	120%	90%
Incremental output per developer	50%	100%	120%	90%
SLA penalties avoided	50%	100%	120%	90%
Incremental output per iWorker	50%	100%	120%	90%

Source: Forrester Research, Inc.

These cost and benefit risk adjustment factors come from Forrester's experience and related TEI case studies, conditioned by responses questions around risk posed during the interviews. Readers are urged to apply their own risk ranges based on their own degree of confidence in the cost and benefit estimates.

Financial Summary

The financial results calculated in the Costs and Benefits sections above are used to determine the return on investment, net present value, and payback period for the organization's investment in SQL Server 2012 as shown in Table 13.

Table 13

Cash Flow — Non-Risk-Adjusted

Cash flow — original estimates						
	Initial	Year 1	Year 2	Year 3	Total	Present value
Costs	(\$209,816)	(\$42,129)	(\$42,129)	(\$42,129)	(\$336,203)	(\$314,585)
Benefits		\$247,305	\$414,318	\$454,610	\$1,116,233	\$908,789
Net benefits	(\$209,816)	\$205,176	\$372,189	\$412,481	\$780,030	\$594,205
ROI	189%					
Payback period	12.1 months					

Source: Forrester Research, Inc.

Table 14 below shows the risk-adjusted ROI, NPV, and payback period values. These values are determined by applying the risk-adjustment values from Table 12 in the Risk section to the cost and benefits numbers in Table 6 and Table 11.

Table 14

Cash Flow — Risk-Adjusted

Cash flow — risk-adjusted estimates						
	Initial	Year 1	Year 2	Year 3	Total	Present value
Costs	(\$223,445)	(\$42,129)	(\$42,129)	(\$42,129)	(\$349,832)	(\$328,214)
Benefits		\$222,575	\$372,886	\$409,149	\$1,004,609	\$817,910
Net benefits	(\$223,445)	\$180,446	\$330,757	\$367,020	\$654,777	\$489,697
ROI	149%					
Payback period	13.6					

Source: Forrester Research, Inc.

Microsoft SQL Server 2012: Overview

According to Microsoft, SQL Server 2012 is the foundation to the cloud-ready information platform. SQL Server 2012 will help customers unlock breakthrough insights across the organization and approach cloud opportunities, private or public, on their terms backed by advanced capabilities for mission-critical confidence.

SQL Server 2012 sets a new standard for mission critical with industry-required high availability and performance capabilities at low TCO. Additionally, SQL Server 2012 delivers high value through built-in Business Intelligence that has proven scale with greater than 20 TB production cubes while self-service analytics tools help enable broad end user adoption through interactive data exploration and visualizations balanced with IT oversight — all backed by credible, consistent data and highly scalable data warehousing solutions.

Meanwhile, organizations can better enable innovative hybrid IT solutions across server, private or public cloud while connection points from SQL Server 2012 make it easy to take advantage of Windows Azure platform benefits. Additionally, organizations can enjoy built-in support for complex data types to better support the data explosion and expanded interoperability with varied platforms to help modernize for the cloud.

Mission-Critical Confidence

Greater availability. Deliver the required 9s and data protection with AlwaysOn, now with failover cluster instances, active secondaries, connection director capabilities (multi-subnet and read-only intent), and added improvements to availability groups.

Greater performance. Experience a generational leap in performance for Data warehousing and Business Intelligence. xVelocity column store index improves data warehouse queries by 10-100x on star joins. Additionally, xVelocity significantly impacts Business Intelligence by introducing an in-memory analytics engine surfaced in Analysis Services enabling end users to interact with “billions” of rows of data effortlessly. Finally, an overhaul to Full-Text Search brings magnitudes of performance and scale improvements and additional enhancements.

Security for compliance. Help enable compliance with new security features, Default Schema for Windows Groups, Audit filtering and resilience, and Contained Database Authentication.

Breakthrough Insight

Rapid data exploration. Discover new insights at the speed of thought with Power View, a highly interactive, familiar browser-based data exploration, visualization, and presentation experiences for users of all levels — backed by the power of xVelocity in-memory technologies.

Managed self-service BI. PowerPivot enables IT to proactively empower end users through familiar self-service BI capabilities in Excel, while providing IT Dashboards in SharePoint 2010 to gain insight and oversight over end users create content. The new BI Semantic Model (BISM) continues to bridging the gap between end user-created BI applications and IT managed corporate solutions by introducing the ability to import PowerPivot models into Analysis Services through the SQL Server professional tools (Management Studio and BI Development Studio) so that they can be professionally managed and transformed into massively scaling corporate grade solutions.

Credible, consistent data. Provide a consistent view across heterogeneous data sources with the BI Semantic Model (BISM), a single model for business intelligence applications, from reporting and analysis to dashboards and scorecards. Make data quality a part of everyday life with the Master Data Services Add-in for Excel and new Data Quality Services that is integrated with third-party data providers through Windows Azure Marketplace DataMarket.

Cloud On Your Terms

Productive development experience. Optimize IT and developer productivity across server and cloud with Data-tier Application Component (DAC) parity with SQL Azure and new SQL Server Data Tools for a unified and modern development experience across database, BI, and cloud functions.

Extend any data, anywhere. New beyond relational investments include, FileTable unstructured file storage directly in the database and full globe spatial support which include circular arcs on the ellipsoid. Meanwhile, customers can further extend heterogeneous environments with additional ODBC and JDBC drivers for PHP, Java, and Linux.

Appendix A: Composite Organization Description

For this TEI study, Forrester has created a composite organization to illustrate the quantifiable costs and benefits of upgrading to Microsoft SQL Server 2012 from previous versions of SQL Server. Based on the interviews with 10 existing SQL Server 2012 customers, the composite organization presented here is the data services team within a centralized provider of information technology and other support services to a host of financial services departments. The enterprise has approximately 12,000 employees, holds more than 5 million customer records, and handles approximately 1,000,000 SQL Server database queries per day. The data services group manages data stores behind mission-critical applications that must be available 24x7, and processes \$1 billion in financial transaction per year.

SQL Server 2012 Environment

- Enterprise has had a mix of SQL Server 2005 and 2008 for 75% of the organization's database environment.
- Six database administrators and 10 IT managers and database developers.
- 12 databases, 36 SQL Server instances, eight physical servers.
- 10 terabytes of data.

Key Drivers Behind SQL Server 2012 Upgrade

- Improvements in availability for mission-critical applications, with decreases in downtime and greater assurance of data integrity (adds one 9, e.g., moving from four to five 9s). 24 x 7 availability and single version of data truth can be achieved via SQL Server 2012.
- New business intelligence capabilities and moving BI self-service capabilities to iWorkers.
- Increases in performance as measured by the number of business transactions processed.
- The ability to read secondary databases for reporting, backups, and other benefits of easier replication.
- To build a solid platform and a tested, proven solution for future implementations and more applications.
- Specific, individual features, such as spatial for some programmers, or contained DB login for lower maintenance security, are of very high importance and financial value to some companies.
- Evaluation of alternative DBMSes indicated that SQL Server 2012 was the most cost effective choice while meeting requirements.

Appendix B: Total Economic Impact™ Overview

Total Economic Impact is a methodology developed by Forrester Research that enhances a company's technology decision-making processes and assists vendors in communicating the value proposition of their products and services to clients. The TEI methodology helps companies demonstrate, justify, and realize the tangible value of IT initiatives to both senior management and other key business stakeholders.

The TEI methodology consists of four components to evaluate investment value: benefits, costs, risks, and flexibility.

Benefits

Benefits represent the value delivered to the user organization — IT and/or business units — by the proposed product or project. Often product or project justification exercises focus just on IT cost and cost reduction, leaving little room to analyze the effect of the technology on the entire organization. The TEI methodology and the resulting financial model place equal weight on the measure of benefits and the measure of costs, allowing for a full examination of the effect of the technology on the entire organization. Calculation of benefit estimates involves a clear dialogue with the user organization to understand the specific value that is created. In addition, Forrester also requires that there be a clear line of accountability established between the measurement and justification of benefit estimates after the project has been completed. This ensures that benefit estimates tie back directly to the bottom line.

Costs

Costs represent the investment necessary to capture the value, or benefits, of the proposed project. IT or the business units may incur costs in the form of fully burdened labor, subcontractors, or materials. Costs consider all the investments and expenses necessary to deliver the proposed value. In addition, the cost category within TEI captures any incremental costs over the existing environment for ongoing costs associated with the solution. All costs must be tied to the benefits that are created.

Risk

Risk measures the uncertainty of benefit and cost estimates contained within the investment. Uncertainty is measured in two ways: 1) the likelihood that the cost and benefit estimates will meet the original projections, and 2) the likelihood that the estimates will be measured and tracked over time. TEI applies a probability density function known as “triangular distribution” to the values entered. At minimum, three values are calculated to estimate the underlying range around each cost and benefit.

Flexibility

Within the TEI methodology, direct benefits represent one part of the investment value. While direct benefits can typically be the primary way to justify a project, Forrester believes that organizations should be able to measure the strategic value of an investment. Flexibility represents the value that can be obtained for some future additional investment building on top of the initial investment already made. Having the ability to capture that benefit has a present value that can be estimated. The flexibility component of TEI captures that value.

Appendix C: Glossary

Discount rate: The interest rate used in cash flow analysis to take into account the time value of money. Although the Federal Reserve Bank sets a discount rate, companies often set a discount rate based on their business and investment environment. Forrester assumes a yearly discount rate of 10% for this analysis. Organizations typically use discount rates between 8% and 16% based on their current environment. Readers are urged to consult their respective organization to determine the most appropriate discount rate to use in their own environment.

Net present value (NPV): The present or current value of (discounted) future net cash flows given an interest rate (the discount rate). A positive project NPV normally indicates that the investment should be made, unless other projects have higher NPVs.

Present value (PV): The present or current value of (discounted) cost and benefit estimates given at an interest rate (the discount rate). The PV of costs and benefits feed into the total net present value of cash flows.

Payback period: The breakeven point for an investment. The point in time at which net benefits (benefits minus costs) equal initial investment or cost.

Return on investment (ROI): A measure of a project's expected return in percentage terms. ROI is calculated by dividing net benefits (benefits minus costs) by costs.

A Note On Cash Flow Tables

The initial investment column contains costs incurred at "time 0" or at the beginning of Year 1. Those costs are not discounted. All other cash flows in Years 1 through 3 are discounted using the discount rate (shown in Framework Assumptions section) at the end of the year. Present value (PV) calculations are calculated for each total cost and benefit estimate. Net present value (NPV) calculations are not calculated until the summary tables and are the sum of the initial investment and the discounted cash flows in each year.

Appendix D: Endnotes

¹ Forrester risk-adjusts the summary financial metrics to take into account the potential uncertainty of the cost and benefit estimates. For more information on Risk, please see page 20.